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FEBRUARY 1966
VOL. 31 NO. 7

Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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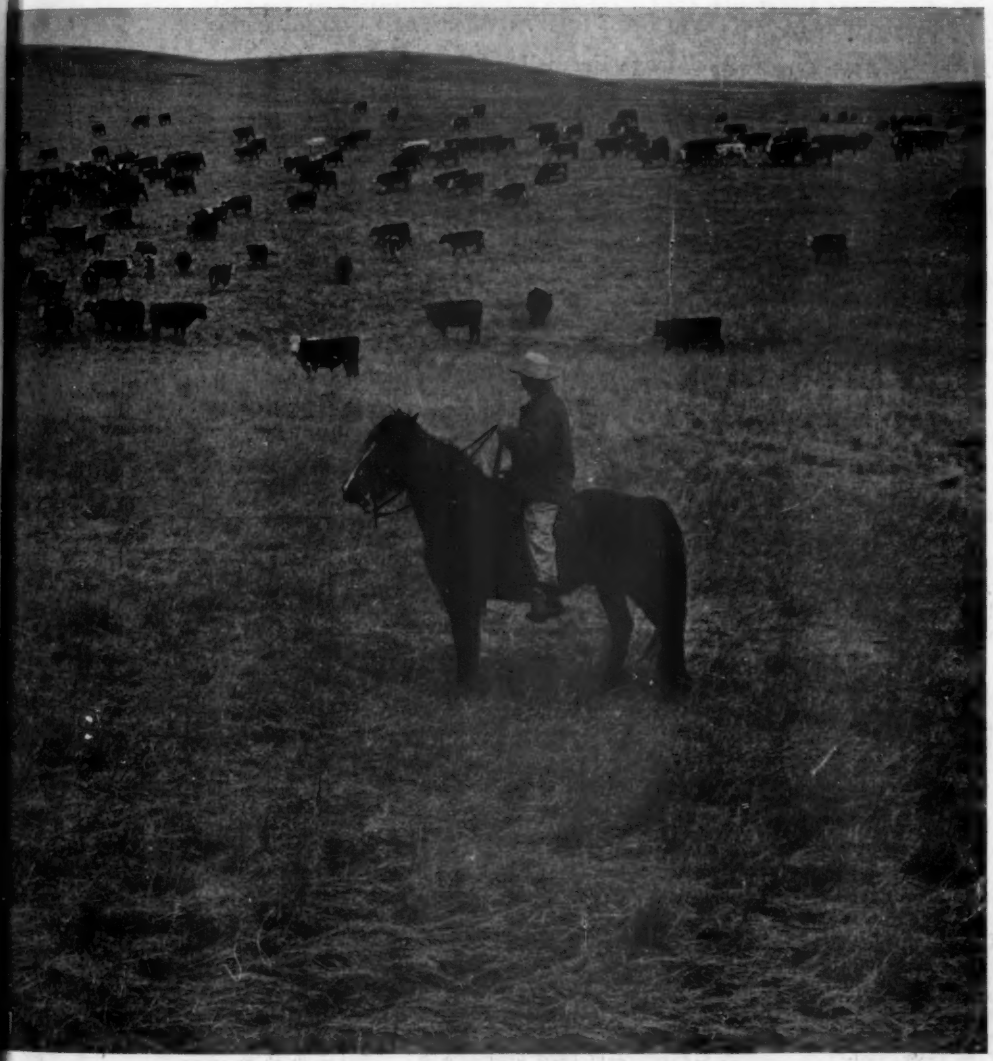

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE

Grazing . . .

Grazing by livestock perhaps impinges on more of the earth's surface than any other potentially damaging effect of man's occupation and use of the land.

A systematic approach to grazing management in every corner of the land, whether grassland or not, would, therefore, be a major advance in conservation technology.

Such an approach is now provided in SCS's recognition of five distinct types of grazing land, embracing the full scope of vegetation types and forage plants, as defined (p. 155) for us by Range Conservationist Bob Williams and Agronomist Burdette Blakely.

SCS conservationists are being trained to appraise all kinds of local grazing lands and advise owners on their safe and profitable use in every section of the country.

Progress: Data on the amounts of individual practices applied (p. 162) give only a hazy notion, at best, of real progress in soil and water conservation.

What counts is the use on each tract of land of the *combination* of practices required to obtain the desired results.

Our reporting system now gives us, for the first time, a record of identifiable areas where the planned combinations have been applied.

The first returns, possibly incomplete, show less than half the planned acreage "adequately treated" (p. 162).

This measure complements the Conservation Needs Inventory in showing the size of the unfinished conservation job.

COVER: South Dakota Rancher Tom Boylan watches a herd of 700 steers move in on an 1,800-acre pasture that has been deferred all summer (story on back page).

Soil Conservation

Devoted to the wise use of land and water resources

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Natural associations of plants on different range sites reflect differences in local environments.

Range Soil Studies

SCS team gathers data on sites to help interpret surveys

By Erasmus W. Williams and Vern K. Hugie
Range Conservationist and Soil Scientist, SCS, Salt Lake City, Utah

JOINT FIELD studies of range soils by a team consisting of a range conservationist and a soil scientist are making possible better interpretations of soil surveys on rangeland.

With better understanding of the relations between soil and climate on the one hand and natural plant cover on the other, conservationists and ranchers or livestock farmers can translate the soil surveys in terms significant to ranch management.

The Soil-Range Investigations Project of the Soil Conservation Service was activated July 1, 1957, with headquarters at Salt Lake City, Utah. Its purpose is to determine the soil, climate, and vegetation characteristics that consistently occur together under natural conditions.

Plant communities

On any natural land area, different species of plants are grouped together on areas that satisfy their growth requirements. Such groups of plants are known as plant communities. Under natural or undisturbed conditions, these communities are the potential or climax vegetation of the areas.

Range "sites" are designated to express differences in the inherent productive capacity of different kinds of rangeland. A range site in its simplest definition is an area having a potential for producing essentially the same kind and amount of vegetation. Each range site has its own combination of enviromental conditions that results in a distinctive plant community.

If all rangeland supported its potential (climax) vegetation, range sites could be quickly identified, and the kind and amount of their production readily determined by study of the vegetation alone. Unfortunately, most rangeland does not now support its potential vegetation.

Changes from the potential plant community of a range site are reflected in the range "condition." Vegetation essentially the same as the potential is classified as in "excellent" range condition. That containing few or none of the plants found in the potential community is classified as being in "poor" condition.

As the range condition declines, it becomes increasingly difficult, and finally impossible, to recognize range sites by their plant communities. Without the potential plant cover, sites must be identified and their potential for production evaluated on the basis of more permanent mappable features of the landscape, such as the soil.

Soil variations

Observation of a great many soils and the native vegetation associated with them indicates that the soils exhibit more variation

than the vegetation they support. This presents a problem in determining what soil taxonomic units, for practical purposes, should be grouped together in a single range site.

To plan for the maximum sustained production of high quality forage, the range manager must know what the potential plant communities of his rangeland are. He needs to know how much and what kind of vegetation each site is capable of producing. The potential plant community usually is a goal towards which management may be directed and is also a criterion for the evaluation of range condition.

Locations selected for study in the soil-range investigations are confined to areas of relict range vegetation that have been little affected by man's activity, such as grazing by livestock, cultivation, or fire, or areas that have been protected from such activities for a long period of time. The vegetation of such areas is considered representative of the potential production of the study locations.

Studies to date have been directed toward (1) the development of methods for evaluating the vegetation of relict plant communities, including total annual yield; (2) environmental factors (soils, climate, etc.) consistently identified with specific communities; and (3) measurements of the annual variations in the kind and amount of vegetation produced on selected locations.

Study locations

Study locations were selected only after extensive reconnaissance in which hundreds of tracts of rangeland were examined, evaluated, and cataloged. Studies are located on soils that are extensive in area, or on soils that bracket the significant variations in the general locality.

Detailed studies have been conducted on 84 locations in southern Idaho, northern Utah, northeastern Nevada, southwestern Colorado, and west central Wyoming.

Range conservationist collects plants from study plot and sorts them by species into paper bags supported by a metal frame. Another metal frame outlines the sample area.

At each location, the current year's growth of vegetation is estimated, clipped, and weighed by species from three closely spaced 9.6-square-foot plots, located on an area selected as having average vegetative cover for the study location. In addition, total annual yield by species is estimated and recorded on 20 random plots of the same size. Estimates on the 20 plots are then adjusted on the basis of the differences between the estimated and actual weights recorded for the clipped plots. Clipped material is then air-dried and all measurements reduced to air-dry weight.

A soil pit is dug to bedrock or below any indication of soil development in the area of the three clipped plots. Each profile is examined and described according to the procedures outlined in the Soil Survey Manual. Detailed notes are recorded on soil surface features, soil fauna, root systems, and the like. Soils at each location are correlated and classified into the national classification system. Selected soil profiles are subjected to laboratory analysis.

Photographs in both black and white and in color are made, including the general landscape, close views of the vegetation, and the exposed soil profile.

Notes include a general description of the study area; the size, vigor, growth habit, relative abundance, and distribution of the principal plant species; and a list of all plant species found in the study area.

Climatic data

Weather records from recording stations are analyzed and interpolated for each study location. Since most study locations are not near weather stations, supplemental precipitation gages were located adjacent to selected studies. Soil moisture samples are also collected periodically at selected locations to assist in determining moisture available for plant growth.

To provide more reliable infor-

mation on the range of fluctuation that occurs in the kind and amount of vegetation over a period of years, continuous total annual yield records are being maintained at 17 selected locations. Yield records have been collected for 8 years at 10 locations, 7 years at 5 locations, and 6 years at 2 locations. In addition to these, more than one season's yields have been measured at 31 other study locations. Total annual yields by species have been recorded for more than 5,000 plots since the project began.

In addition to in-Service reports and papers presented at local, State, and national meetings, nine articles reporting on the project's activities and findings have been printed in journals of national circulation:

Application of Soil-Climate-Vegetation Relations to Soil Survey Interpretations for Range Lands. Jour. Range Mgt. (15)3: 162-166. May 1962.

Sagebrush on Relict Ranges in the Snake River Plains and Northern Great Basin. Jour. Range Mgt. 15(5): 273-278. Sept. 1962.

Variation in Bluebunch Wheatgrass in Relation to Environment and Geographic Location. Ecology. 44(1): 158-161. Winter, 1963.

Some Plant-Soil Relationships on an Ungrazed Range Area of Southeastern Idaho. Jour. Range Mgt. 16(3): 113-118. May 1963.

Cicadas and Their Effect Upon Soil Genesis in Certain Soils in Southern Idaho, Northern Utah, and Northeastern Nevada. Soil Sci. Soc. Amer. Proc. 27(1): 78-82. Jan.-Feb. 1963.

Fluctuating Herbage Production on an Ungrazed Sierozem Soil in Idaho. Jour. Soil and Water Cons. 18(1): 8-11. Jan-Feb. 1963.

Soil Taxonomic Units and Potential Plant Community Relationships in a Pristine Range Area of Southern Idaho. Amer. Soc. Agron. Spec. Pub. 5: 190-205. Oct. 1964.

Herbage Production and Composition Fluctuations of Natural Plant Communities as Related to Climate and Soil Taxonomic Units. Amer. Soc. Agron. Spec. Pub. 5: 206-221. Oct. 1964.

Soil Surface Patterns of Some Semiarid Soils in Northern Utah, Southern Idaho, and Northeastern Nevada. Soil Sci. Soc. Amer. Proc. 28 (6): 786-792. Nov-Dec., 1964. ♦

Forage From Pine Woodlands

Native plants fill gaps in grazing schedules for dairy and beef cattle

By Francis J. Ezernack
Work Unit Conservationist, SCS, DeRidder, La.

FORAGE produced on pine woodlands is an important resource in the South. Planning the use of grazable woodlands in a way to make use of this forage without damaging their woodland values is an important part of total conservation plans for southern farms.

The situation in Beauregard Parish, a part of the Calcasieu Soil and Water Conservation District in southwest Louisiana, is typical of many areas throughout the Southern Coastal Plain.

Most of the 600,000 acres of pine woodland, which is about 80 percent of all the land in Beauregard Parish, is being grazed by livestock.

Until recently, this area was all open range. Because of extensive reforestation in the past 10 to 12 years, much of this land has been fenced. Although much of it is owned by large companies that do not own livestock, most of it is still being grazed.

There are about 50 dairy operations in the parish, and about 300 other livestock operations. Approximately 90 percent of them use grazable woodland. For many, it is the primary source of forage.

This native forage is important to dairymen. Some are so situated that they can lease grazable woodland, and others own woodland that can be grazed. They use the woodlands to fill out their year-round forage needs.

Grazable woodland provides a cheap source of adequate forage for dry dairy cows and replacement heifers, which do not need the high quality required for milk-producing cows. The animals are fed supplements when the woodland forage is dormant.

Grazable woodland is a good place to keep livestock during drought, when tame pastures are

Dairy cattle grazing longleaf pine range during early spring find nutritious forage that fills a gap in tame pasture at this time of year.

short, and during extreme wet weather. Woodland forage suffers less from drought than improved pasture. Some dairymen consider it as insurance against dry weather. At other seasons, when the ground is extremely wet, the use of grazable woodland prevents excessive damage to tame pastures by trampling and bogging.

Spring and fall gaps

Two major gaps occur in the grazing program that most dairymen follow. One is in the late spring, April 15 to May 15, when winter pastures of oats, rye, and wheat are coming to an end. Then, fields are plowed and planted to millet, sudan, sorghums, and summer peas for summer grazing. During this period forage in woodlands is in peak condition.

The other gap occurs about September 15 to October 15. At that time, fields are being prepared and planted to oats and rye for winter grazing. Then, dairymen again can use grazable woodland if it is available.

The forage plants in woodlands generally improve under this schedule because they are deferred 4 to 5 months every summer.

Beef cattlemen also use grazable woodlands to help fill out their forage programs. Their herds are rotated between woodlands and improved pasture during the summer while hay is being made on improved pastures.

The woodlands provide shade in the summer and shelter from winter cold. Many beef cows drop calves while in the woods in the winter. In the spring, the cows and calves are moved to improved pastures. By this time, the calves are large enough to graze and utilize the increased milk flow from their mothers. This results in fast growth.

Another group of ranchers that make good use of woodland forage are those operating on the salt marshes along the Gulf Coast. They use the grazable woodland during the summer, from April 15 to October 15, when use of salt marsh is hazardous, because of mosquitoes and deer flies and the possibility of hurricanes. Beef cattle make gains on woodland forage during most of this period. The summer deferment of marsh range helps to maintain it in good condition and assures abundant forage for winter use.

When livestock are moved back to the marsh for the winter and early spring, the woodlands in turn get a 6-months' rest, permitting the forage plants to store plant food for spring growth.

Improved pasture of ryegrass, white clover, coastal bermudagrass, and bahiagrass provides abundant winter forage. This picture was taken in January.

Proper grazing is the key to success in all these forage programs. The primary use of most of the grazable woodland acreage is for timber production; use of the forage is secondary.

Conservation plans developed with Soil Conservation Service assistance provide for grazing use of woodlands that will protect both forage and timber crops, conserve soil and water, and give sustained yield. The combined use of the different grazing resources means more efficient forage harvest and better returns. ♦

Beef cattle graze pine woodland in July while hay is being made on tame pastures. Stock will be returned to tame pasture when woodland forage matures.

Saw-palmetto, a low palmlike shrub, is a problem on 25 million acres of native grazing land in Florida.

Brush Control Takes Unusual Form On Florida's Saw-Palmetto Ranges

By Lewis L. Yarlett
Range Conservationist, SCS, Gainesville, Fla.

RANCHERS in soil conservation districts in south Florida are applying brush control as a conservation practice to an unusual and different situation—the semitropical saw-palmetto savannahs. Basic principles are much the same as those used in controlling invading brush on western ranges, but the plants are different.

Saw-palmetto (*Serenoa repens*) is a perennial, shrubby member of the palm family that grows abundantly on the rangelands of central and south Florida. It has a creeping stem about 4 to 6 inches in diameter with a large number of roots on the under side. The stems are branched and often extend along the surface for 30 feet or more.

The ground cover of the stems and fronds varies from sparse to impenetrable thickets. Many of the native grasses are found growing within the protection of these plants, but due to competition for light, moisture, and nutrients, they are low in vigor.

Creeping bluestem (*Andropogon stolonifer*) is the most important of these grasses. In poor condition ranges where saw-palmetto is abundant, creeping bluestem produces only 150 to 200 pounds of forage an acre.

Approximately 25 million acres of grazable woodland and rangeland are heavily infested by saw-palmetto. Historical notes and experiences of early-day ranchers indicate that the little palm occupies more acreage today than it did 75 years ago.

Ranchers in south Florida are obtaining 80 percent control of

The photos with this article are part of a series that won second prize in the Picture Story Contest of the American Society of Range Management at its 1965 annual meeting in Las Vegas, Nev.

Two roller choppers hooked in tandem behind a crawler tractor cut stems and terminal shoots of saw-palmetto.

saw-palmetto by cutting brush one time over with two heavy-duty roller choppers hooked in tamdem. Chopping is done in the period from December through March, at an approximate cost of $4 to $5 an acre. The treated range is deferred for a complete growing season, usually through November. Fringe areas around marshes, ponds, and major drainways are left undisturbed for wildlife cover and shelter for livestock.

Forage production by creeping bluestem commonly increases to 1,600 pounds an acre green weight in 3 months and to 6,000 pounds an acre in 11 months after chopping. Quail and turkey normally increase on treated range. ♦

Plans for 10 New RC&D Projects Stress Recreation, New Markets

THE DEVELOPMENT of recreation facilities and expansion of markets for local products are major features of 10 new Resource Conservation and Development Projects authorized by the Secretary of Agriculture to receive USDA assistance in planning after funds for this purpose were included in the 1966 Department of Agriculture appropriations act.

The projects cover more than 21 million acres. They bring to more than 38½ million acres the combined area of 20 approved projects now receiving assistance through the RC&D program administered by the Soil Conservation Service.

The new project areas and the principal objectives of their sponsors are:

Tradewater River Area, Kentucky—1,718,000 acres in Christian, Hopkins, Caldwell, Crittenden, Webster, and Union counties. Development of 13 watershed projects under Public Law 566, recreation development on public and private land, control of salt marsh mosquitoes, and abatement of water pollution.

Hull-York Lakeland, Tennessee—2,578,480 acres in Clay, DeKalb, Fentress, Jackson, Macon, Overton, Pickett, Putnam, Smith, Cumberland, and White counties. Multiple-use development in small watershed projects, wood products industries, and markets for Christmas trees, greenery, and edible nuts.

Little Kanawha Area, West Virginia—1,138,130 acres in Calhoun, Roane, Ritchie, Wirt, and Wood counties. Reduction of flood damage, increased water supplies for area development, reforestation and improved woodland management, and markets for wood crops.

Ozark Highlands Area, Oklahoma—1,325,440 acres in Adair, Cherokee, and Delaware counties. Recreation development, marketing and storage facilities for fruit, berry, truck, and nut crops, and for hardwood timber products, and expansion of commercial plant nurseries on family farms.

St. John-Aroostook, Maine—2,721,733 acres in Aroostook and part of Penobscot counties. Recreation development, improvement of forest resources, and local processing and marketing facilities for agricultural and forest products.

Top of the Ozarks Rivers, Missouri—2,970,880 acres in Dent, Howell, Oregon, Shannon, and Texas counties. Improved timber management, reduction of flood and sediment damage, water supplies, and recreation development.

Arkansas River Valley Area, Arkansas—3,676,800 acres in Sebastian, Scott, Crawford, Franklin, Johnson, Pope, Yell, and Logan counties. Improved recreation resources and woodland management, retraining displaced farm people, and increasing employment opportunities.

Bitterroot Valley, Montana—1,800,760 acres in Ravalli and part of Missoula counties. Increasing tourism and expanding industrial developments.

Coosa Valley Area, Alabama—1,676,500 acres in Calhoun, Clay, St. Clair, and Talladega counties. Development of recreation and tourism, expansion of markets for wood crops, increased farm income, and industrial and commercial employment.

Southeast Delta, Mississippi—1,474,166 acres in Humphreys, Leflore, Sunflower, and parts of Carroll, Holmes, and Yazoo counties. Flood prevention and improved water management, recreation development, and tourism. ♦

American Conservation Congress in Brazil

Resource conservation problems, techniques, and progress in the Americas will be reviewed April 12-29 at the First Pan-American Congress of Soil Conservation, to be held in Sao Paulo, Brazil.

The Congress is sponsored by the Brazilian Ministry of Agriculture and the Agricultural Secretary of the State of Sao Paulo. Several nations are represented in developing and participating in the sessions.

Prominent authorities from government agencies and colleges in the United States and other Western Hemisphere countries are being invited to address the plenary sessions.

The Congress program also will include 6 sections dealing with various phases of the conservation field, with 20-minute presentations on 32 different topics. A number of field trips and social programs also are being planned.

Papers will be presented in three languages—English, Spanish, or Portuguese. At the beginning of each session, mimeographed copies of the papers will be given to participants.

After the close of the Congress, a Proceedings will be published. ♦

Dual crops on rangeland . . .

Wildlife and Livestock Can Thrive Together Under Good Management

By Wade H. Hamor and Arnold Heerwagen
Biologist and Range Conservationist, Regional Technical Service Center, SCS, Lincoln, Nebr.

MOST RANGELAND managed for the production of domestic livestock is also used by wildlife. The intentional management for dual use by livestock and wildlife, while not commonplace, is increasing in popularity. The underlying reason is the economic value of wildlife and its income possibilities to ranchers.

On ranches where consideration is given to habitat for deer and wild turkey, the added income amounts to $.75 to $1 or more an acre. It is much more on some ranches.

One example is a Texas ranch that is managed primarily for deer and other kinds of wildlife. Here deer numbers are reported to be about one for every 3.3 acres. Hunters coming from a wide area provide a major part of ranch income. On another ranch, hunting rights were returning about twice as much per deer as cattle were yielding per head on the market.

More important than money

On many ranches the charging of a fee for the right to enter for the purpose of hunting or fishing simply serves to augment the ranch income. Owners and operators realized fringe benefits in more rigid control of trespass, less vandalism, good landowner-sportsman relations, and better control over the amount of wildlife that the owner feels should be taken from his land. Many owners consider these more important than the money.

The 1959 Census of Agriculture reported 642 million acres of range and pasture land in farms and ranches of the 48 contiguous States. The vast majority of this is rangeland.

At sometime during the year this land is used by wildlife of one kind or another. The most important are white-tailed deer, mule deer, elk, antelope, wild ducks, turkeys, sage grouse, sharptailed grouse, prairie chickens, and quail. Of course, not all rangeland can support all species or kinds of wildlife. The wild occupants of an area are determined by the location of the land, its slope, plant cover, altitude, precipitation, and other factors.

How much competition?

Game birds offer little competition with domestic livestock for forage. Big game, on the other hand, may compete directly. Cattle and elk, for example, may graze the same range at certain times of the year and compete for grass and other forage. Sheep, deer, and antelope prefer forbs for food and utilize browse plants extensively. Cattle and elk may use these plants as a second choice food and so exert some degree of competition with those animals that are primarily forb users. Cattle graze these plants incidentally on good range, but intentionally on overgrazed ranges.

On northern grassland ranges having only scattered trees and shrubs, cattle destroy much of their value for browse by rubbing against them. Since the browse could be utilized to support larger numbers of deer and antelope, the cattle compete indirectly with game animals on these ranges.

A rancher wanting to maintain or increase his deer and antelope herds will protect segments of land that support browse plants. Fencing is one method of protecting deer browse, and, on many northern ranches, it is the only practical method. If more browse

Elk herd on Philmont Scout Ranch in New Mexico is provided for in grazing plan as cooperator with Eastern Colfax SCD.

plants are needed the fence should be set well away from the established plants. This permits the seeds and suckers of the old plants to invade the area.

Where animals have a preference, cattle, antelope, ducks, and grouse use flat to gently rolling terrain. Deer, turkey, and elk, by choice, occupy the steeper slopes. Land management for a particular species is most successful when applied to the preferred slopes.

Home for antelope

Antelope management includes protecting food plants from damage or destruction by other grazing animals and from overgazing by the antelope themselves. Control of numbers of both domestic livestock and antelope is required to maintain productive range.

The use of herbicides to favor grass for cattle or sheep must be carefully controlled to protect desirable forbs and browse plants of use to antelope as well as to deer and other wild species.

Management includes a careful evaluation of current seasonal use of food plants. When such an evaluation indicates that choice foods are being overgrazed to the point that the plants are dying or that their vigor is much reduced, overuse is taking place. An immediate reduction in the number of animals is necessary to maintain or improve the carrying capacity of the range.

The presence of open water, such as streams, springs, and ranch ponds, is an important element of habitat. Ponds and springs built or developed primarily for livestock water are needed and used by deer, wild turkey, and waterfowl. Without open water at reasonable distances, the range is uninhabitable by these animals.

Studies have shown that ranch ponds may be important to sage grouse, since nests of these birds are often concentrated nearby.

Sharptailed grouse thrive on rangeland that is lightly grazed or not grazed at all. Native grasslands cut for hay every other year are productive sharptail range. Stands of dense grasses or grasslike plants are highly important to this bird. The buds of trees and shrubs growing along stream courses and in draws supply winter foods. Wild rose hips are a basic food. Ranchers wanting good numbers of sharptails will manage their rangelands to provide this kind of food and cover.

Wild turkeys occupy the larger and more mature wooded areas on ranges. Nuts, acorns, the seeds of pine, and wild fruit are essential to their welfare. Heavy grazing often damages or removes such habitat.

The combination of ranch ponds and properly grazed rangelands in the Northern States supply favorite nesting and brood rearing habitat for wild ducks. Several years ago a study was made of such ponds in the range country of South Dakota. It showed that each pond was producing 20 to 23 young ducks each year. The total contribution to the flyway per square mile of rangeland averaged about 26 ducks per year.

Range improvement measures other than grazing management need to be given careful study as to their impact on livestock and wildlife. Without such consideration, measures aimed primarily at improving livestock forage supply may adversely affect wildlife habitat. With appropriate modification certain pactices can benefit both kinds of animals. ♦

A Grass Farmer, Not a Cattleman

FRIENDS and business acquaintances of Claude Staples of Brigham City, Utah, and points west are often surprised to hear that he is a "grass farmer," not a cattleman.

"I just use cows to harvest my crop," Staples tells those who ask about his unique way of making a living.

The number of cows bought to do the harvesting depends on the amount of feed available in the fall. This, of course, depends to a large extent on the amount of rain, the grasshopper and army worm infestations, and other factors that determine plant growth. A production check is made each fall, and the amount of forage found determines when and how many cows are purchased.

Staples signed a cooperative agreement with the Northern Utah Soil Conservation District in June 1953. Since that time, he has consulted repeatedly with Soil Conservation Service technicians on how to turn lowgrade land into the lush pastures seen on his ranch.

His busiest seasons are spring and fall, when he is occupied with raising grass. He irrigates nearly 1,000 acres with about 4 second-feet of water distributed through a series of contour ditches. The Soil Conservation Service helped plan and lay out the system.

About 700 acres formerly in dryland wheat have been seeded to intermediate and pubescent wheatgrass. The grass was seeded with a deep-furrow drill directly into grain stubble in March of the year following the last harvest. The planting was not grazed for 2 years following seeding and is now used only in the winter.

There are 453 acres of native meadow, mostly saltgrass, which provides about 2 cow-months of feed an acre when grazed in the winter.

After the grass has been raised, cattle begin moving onto the ranch from reputable herds in Wyoming and Montana. They are wintered, then sold, usually before March 1, so next year's grass crop is not affected.—BENJAMIN B. HEYWOOD, *Range Conservationist, SCS, Logan, Utah.* ♦

Conservation of Grazing Land

By Robert E. Williams and B. D. Blakely
Head Range Conservationist and Head Conservation Agronomist, SCS

THE PLOW, the ax, and the hoof have been called the three greatest causes of soil erosion and accelerated runoff.

Of these, the hoof—the impact of grazing animals on the land—affects the greatest portion of our Nation's land resources.

Altogether, more than 950 million acres, or more than half the land area of the United States, is used for grazing by domestic livestock.

Management of grazing land in accordance with the needs of the soil and the plants being grazed, therefore, is a big part of the national conservation effort.

Grazing lands occur in all parts of the country. They include 485 million acres of non-Federal land in farms and ranches, 242 million acres of Federal grazing land, 161 million acres of non-Federal forest and woodland, and 65 million acres of cropland regularly grazed as rotation pasture in cropping systems.

Fundamentals

The diversity of grazing land types calls for like diversity in management techniques, although the fundamental principles of encouraging the growth of desirable forage plants, protecting the soil, and conserving moisture apply in all instances.

The experience of the Soil Conservation Service in helping farmers and ranchers plan conservation use of their grazing land, and in applying research findings to their varied problems, has led to recognizing five distinct types of grazing land: (1) Rangeland, (2) grazable woodland, (3) native pasture, (4) permanent tame pasture, and (5) rotation pasture on cropland. These types are defined and illustrated on the following pages.

Most ranches and livestock farms have at least two, and often more, types of grazing land. Each requires its own adaptation of conservation principles.

Sound conservation plans developed by district cooperators combine the use of the different grazing land resources to provide adequate forage and feed with a margin of reserves to permit timely livestock adjustments needed to protect basic soil and plant resources.

To plan a conservation grazing program a livestock producer must first understand the different kinds of land he has and the capability of each to produce forage. Knowledge of soils, topography, and climate, and their effects on forage production, are important. The operator must also know the important grasses, legumes, and forbs best suited to each kind of land.

The first important decision the operator must make is, "What forage plants do I want to manage for on each kind of land." The decision depends on what kinds of plants are growing on the land *now* as compared to what could be there, the seasonal grazing needs of his livestock enterprise, and the costs of practices that might be needed in relation to what they might accomplish.

Having decided what plants to manage for, the operator must choose the grazing systems and management practices that will increase them if they are present, or establish them if not.

Since grasses and other forage plants manufacture food for growth in their leaves, grazing must be regulated to leave enough leaf material to enable the plant to function and grow properly. In other words, the needs of the plant must be considered as well as the needs of the animals.

The plants use the food manufactured in their leaves to produce more leaves, roots, and to make seeds. As the plant develops through the season, its needs change. Food stored in the roots is used to send up the first green shoots in the spring. These shoots soon grow enough to produce their own food and a surplus to serve other parts of the plant. Seedheads develop, seeds mature, and surplus food is stored again in the roots for next season.

The key plants

The different kinds of plants that make up the forage resource on each of the five general types of grazing land—whether they are native plants that naturally dominate the site, or flourish in the shade of trees, or establish themselves where trees are removed, or plants that have to be planted and maintained by cultural means—these facts determine the kinds of grazing systems that will succeed in each case. The chosen system should enable the operator to give his grazing land occasional rest, permit careful harvest of forage to meet the needs of the plants, and provide for adequate forage at all seasons of the year.

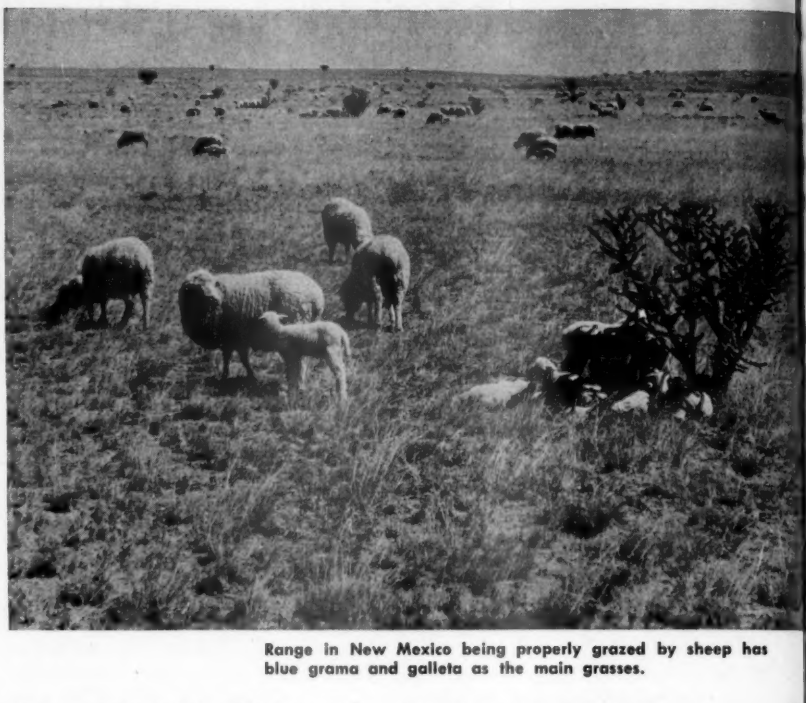
When grazing management is carried out in this way, plants remain healthy and productive, the land is protected, and livestock production is efficient.

The Five General Types of Grazing Land

1. *Range*

Range is land on which the natural potential (climax) plant cover is composed principally of native grasses, forbs, and shrubs valuable for forage. Rangelands include the natural grasslands and savannahs, such as the prairies and plains, oak and juniper savannahs, and chaparral or brushlands.

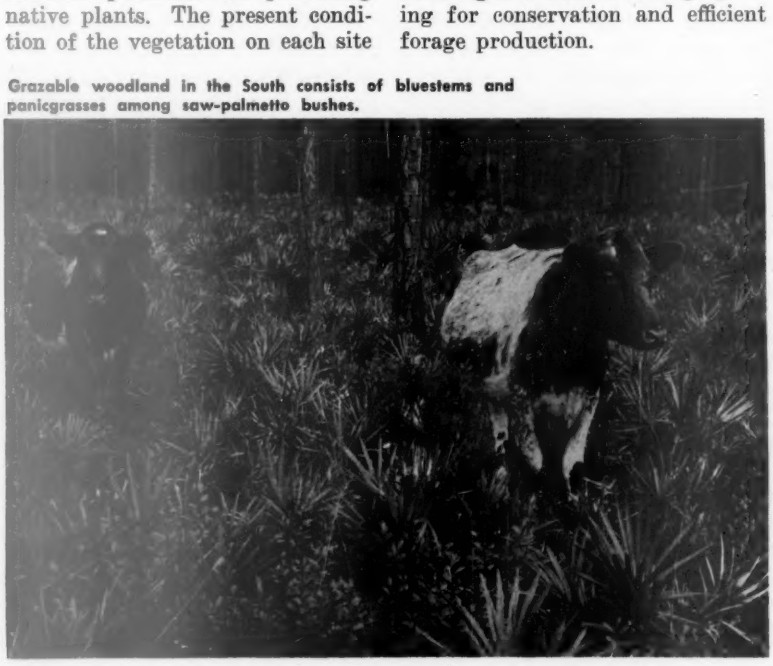
Conservation treatment is achieved primarily by regulating the intensity of grazing (numbers of livestock) and season of use (time of year) to protect and favor the more desirable forage plants. In addition to proper grazing, such practices as brush control, range seeding, and grazing systems can speed up range improvement. Fences, stock watering facilities (wells, springs, ponds), and trails or walkways make livestock control possible and management easier.



Range in New Mexico being properly grazed by sheep has blue grama and galleta as the main grasses.

Capability of rangeland is expressed in terms of range sites, or distinctive kinds of range with different potentials for producing native plants. The present condition of the vegetation on each site is then evaluated in relation to the potential for the site as a basis for deciding how best to manage grazing for conservation and efficient forage production.

Grazable woodland in the South consists of bluestems and panicgrasses among saw-palmetto bushes.



2. *Grazable Woodland*

Grazable woodland includes forested land managed for timber production which also produces significant amounts of forage that can be moderately grazed without damaging other forest values.

Grazable woodlands consist mostly of areas of ponderosa pine and pinion-juniper in the West, and slash and longleaf pine in the South.

Forage production fluctuates with development of the stand of trees. Conservation management requires proper season of use in relation to forage and tree development, protection of young plantations from all grazing for 2 or 3 years, and grazed firebreaks.

Moderate grazing aids in keeping down fire hazard by eliminating some of the fuel and brings in some income while trees are maturing.

Since grazing is a secondary use of such areas, it must be very carefully controlled.

Native pasture of little bluestem, switchgrass, and Indiangrass released by chemical control of brush.

3. *Native Pasture*

Native pasture includes land managed to produce stands of native or "escaped" introduced plants for forage where the natural cover was once forest. Such land includes cutover forest land, abandoned cropland, or former tame pasture which has reverted to native grasses.

Native pasture may be too steep, wet, or rocky for the usual treatments of permanent tame pasture, and the operator may not want to put it back in trees.

Careful livestock management is necessary on native pastures to maintain adequate cover for soil protection and water conservation.

Brush control on all areas and the application of fertilizer on some areas are needed in addition to careful grazing use.

4. *Permanent Tame Pasture*

Permanent tame pasture is land on which introduced forage plants are maintained through intensive cultural treatments such as fertilization, periodic reseeding, and proper grazing management to maintain vigorous and productive plants. In addition, weed control is often needed.

This kind of pasture is suited to many kinds of soils. It is one of the best uses for land unsuited for cultivation due to steep slopes, poor drainage, or erosion hazards when in cultivated crops.

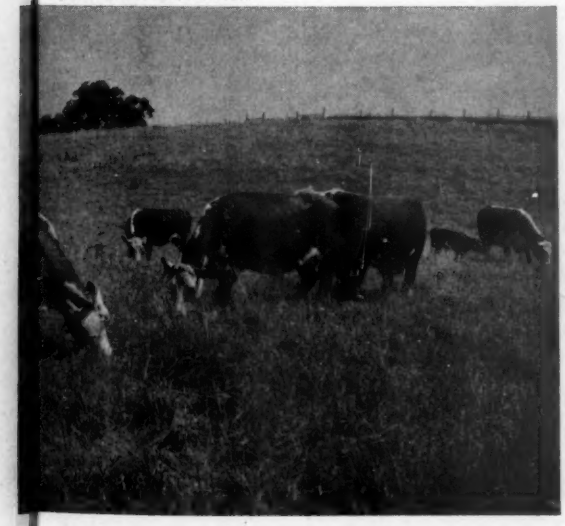
5. *Rotation Pasture*

Rotation pastures are cultivated land planted to grasses and legumes and grazed as a part of the normal cropping systems.

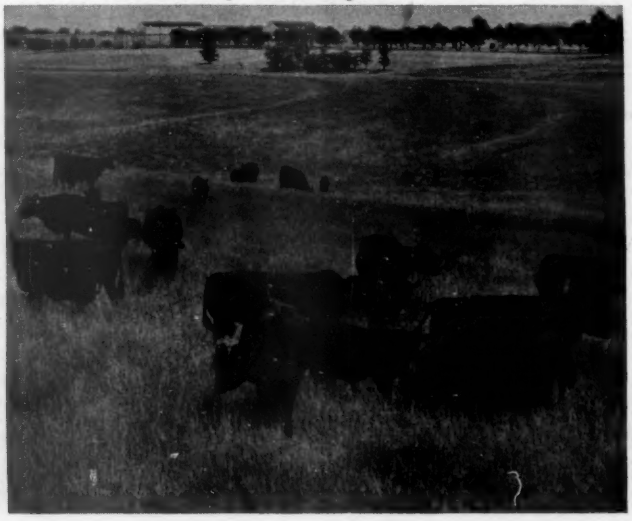
Such areas usually are used for grazing or hay for 3 or 4 years then planted to a cultivated crop. Fertilization and proper grazing management are needed to maintain a productive stand of forage plants.

The use of grasses and legumes in a cropping system under good grazing management is an excellent way to improve soil conditions on cropland. ♦

Permanent tame pasture in West Virginia consists of orchardgrass and ladino clover.



Rotation pasture of tall fescue and ladino clover in sequence with row crops and small grain.



Proceedings of the Federal Inter-Agency Sedimentation Conference 1963. PREPARED BY AGRICULTURAL RESEARCH SERVICE. *1965. USDA Misc. Pub. 970. 933 pp., illus. $5.75.*

This publication contains 91 technical papers plus opening speeches, discussions, and the list of attendance from the Second Federal Inter-Agency Sedimentation Conference, held in Jackson, Miss., January 28 to February 1, 1963. The conference was sponsored by the 13 Federal agencies represented on the Subcommittee on Sedimentation of the Inter-Agency Committee on Water Resources.

Four symposiums were held consecutively on these subjects: (1) Land Erosion and Control, 26 papers; (2) Sediment in Streams, 36 papers; (3) Sedimentation in Estuaries, Harbors, and Coastal Areas, 15 papers; and (4) Sedimentation in Reservoirs, 14 papers. Two of the opening addresses and 6 of the technical papers were prepared and presented by people from the Soil Conservation Service. Carl Brown (deceased) reflected on the First Sedimentation Conference held 15 years earlier in Denver. L. C. Gottschalk (deceased) gave the keynote address and set the tone of the meeting.

Included in the symposiums were the following technical papers from the Soil Conservation Service: "Erosion and Its Control on Agricultural Lands," by John W. Roehl; "Geology in Sediment Delivery Ratios," by Sam B. Maner; "Gully Control Methods in Iowa," by Paul Jacobson; "Some Aspects of Fluvial Morphology Influencing Investigations of Channel Stability," by Elliott M. Flaxman; "Design of Stable Channels in Erodible Materials," by Paul D. Doubt; and "Developing Sediment Storage Requirements for Upstream Retarding Structures," by A. F. Geiger.

This volume presents a wealth of information in the form of tables, graphs, sketches, and photographs, as well as text. It is a valuable reference for all who are concerned with sediment and the processes that create and affect sediment. The sum of knowledge presented is indicative of the current state of progress in this field and of the current thinking of geologists and engineers who are sedimentation specialists both in government and in universities.—JOHN N. HOLEMAN, *Geologist, SCS, Hyattsville, Md.*

Outdoor Recreation in the National Forests. BY U. S. FOREST SERVICE. *1965. USDA, Agr. Inf. Bul. 301. 106 pp., illus.*

National forests constitute a major element of our total resources for outdoor recreation. For several types of recreation activities, they provide the major public land opportunities now and a tremendous potential for the future. This summation of the background, resources, recreation developments, activities, policies, and future prospects of our national forests in the outdoor recreation field is timely and welcome.

It is crammed with facts and statistics and is well illustrated. However, it is mainly useful to the professional conservationist or recreation specialist and to laymen deeply concerned with outdoor recreation.

It will be a valuable source book on the operation of Federal lands. Of particular significance is the section on policies with regard to such questions as multiple use, development and operation of facilities through private enterprise, restriction of the kinds of public developments in keeping with the nature of a forest, and avoiding competition with the private sector in handling wilderness areas. Any public land agency, Federal or State, would find valuable guidance in the broad experience of the Forest Service in this field.—FRANK C. EDMINSTER, *Resource Development Division, SCS, Washington, D. C.*

New Publications

Losses in Agriculture. *1965. USDA Agr. Hdbk. 291. 120 pp., illus.* Brings up to date information on the losses incurred in the production, processing, transportation, and marketing of farm and forest products.

Indian Land Areas. *1965. U. S. Dept. Interior, Bureau of Indian Affairs. 36x26 inch, folded to 4x8¾.* Map showing Indian lands and listing field office addresses of the Bureau, including principal tribes within jurisdiction of each.

American Indian Calendar. *1965. U. S. Dept. Interior, Bureau of Indian Affairs. 52 pp., illus.* An 8½ x 3¾" brochure listing ceremonials, dances, feasts, and other celebrations on or near Indian reservations of interest to tourists.

Vacationing with Indians. BY THE BUREAU OF INDIAN AFFAIRS. *1965. U. S. Dept. Interior. 72 pp., illus.* A pocket guide to campgrounds and tourist attractions on Indian reservations.

Answers to Questions About American Indians. *1965. U. S. Dept. Interior, Bureau of Indian Affairs. 56 pp.*

Soil Surveys

Allen County, Ohio. BY R. L. HEFFNER, A. R. BROCK, R. L. CHRISTMAN, AND D. D. WATERS. *1965. 99 pp., illus.; maps 4 inches to the mile (1:15,840).* Surveyed by Department of Natural Resources, Division of Lands and Soil, State of Ohio.

Gem County Area, Idaho. BY F. R. TROEH, J. C. CHUGG, G. H. LOGAN, C. W. CASE, AND VIRGIL COULSON. *1965. 196 pp., illus.; maps 4 inches to the mile (1:15,840).*

Gordon County, Georgia. BY GLENN L. BRAMLETT. *1965. 171 pp., illus.; maps 4 inches to the mile (1:15,840).* Soils surveyed by Glenn L. Bramlett and Howard T. Stoner.

Calhoun County, Mississippi. BY J. W. MCMULLEN, J. S. HUDDLESTON, CHARLES BOWEN, AND R. E. DAVIS. *1965. 65 pp., illus.; maps 4 inches to the mile (1:15,840).*

Seward County, Kansas. BY HAROLD P. DICKEY, W. R. SWAFFORD, AND Q. L. MARKLEY. *1965. 51 pp., illus; maps 3.17 inches to the mile (1:20,000).*

A Better Place To Live

Summary of Activities of the Soil Conservation Service 1965

THE ESTHETIC, recreational, and other multiple-use aspects of conservation claimed increasing attention of the Soil Conservation Service during fiscal year 1965 as the Federal Government advanced its programs to adjust agricultural production and make the countryside a more pleasant place to live.

Rural beauty

The panel on "The Farm Landscape" of the White House Conference on Natural Beauty in May reported to the President:

"Less than 3 percent of our land is devoted to urban uses. Because of this fact, efforts to preserve and improve natural beauty and to create a more attractive America must rely heavily on what is done in rural areas. Some three-fourths of the land in these areas is in private hands. It therefore follows that for the greater part of America decisions about planning use and management of the resources which constitute the landscape rest in the hands of private individuals and their local organizations."

In response to a recommendation by the Farm Landscape panel "that preservation and enhancement of natural beauty be made an associated purpose of Federal programs of resources development and management," the Soil Conservation Service instructed its fieldmen giving assistance to land users and public planning agencies to give full consideration to "ways in which land use and soil and water conservation measures can improve the beauty of the countryside, especially areas visible from roads and highways."

The directive called for special emphasis on conservation practices having natural beauty and landscaping values, the use of plant materials that contribute to natural beauty, and the elimination of "eyesore" areas.

The influence of SCS conservation planning assistance has far-reaching effect on the actions of private landowners and local organizations through soil conservation districts, small watershed projects, and consultation with public planning bodies.

In fiscal 1965, for the first time the number of cooperators with conservation districts exceeded 2 million and included more than half the farm operators in the United States. During the year, SCS provided more than 3.3 million separate services on conservation planning or application assistance to more than half the cooperators.

In addition, SCS provided over 94,000 consultive conservation services to county and municipal agencies, local organizations and business concerns, and private land owners and operators. It also was providing continuing technical services to 635 small watershed projects in operation and 342 others in the planning stage.

Even before this concerted emphasis on landscape beautification, soil conservation had contributed greatly to improving the appearance of the countryside by healing the unsightly scars of erosion, revegetating denuded forest and range land, planting windbreaks and wildlife habitat areas, shaping and grassing roadside banks and waterways, creating ponds and lakes, and fitting roads, field boundaries, and crop rows to the curving contours of the land.

A majority of the more than 125 conservation practices reported by soil conservation districts (see table) make direct contributions to landscape beauty wherever used. The others indirectly enhance natural beauty by contributing to stable and harmonious land use and vegetation patterns.

Rural recreation

Rural landowners continued to establish primary or supplementary income-producing recreation enterprises and to develop outdoor recreation resources on their property in response to encouragement and assistance from the Department of Agriculture.

By the end of fiscal 1965, approximately 31,521 conservation district cooperators had established 1 or more recreation enterprises with SCS technical assistance since the Food and Agriculture Act of 1962 became effective. A total of 2,743 operators had converted to recreation as their major source of income on 631,742 acres.

Approximately 284,200 acres of farmland was converted from traditional agricultural use to recreation in fiscal 1965.

An inventory of outdoor recreation areas and enterprises, both private and public, was begun in cooperation with soil conservation districts and other agencies. The

inventory will provide for the first time basic data on outdoor recreation comparable to information normally available for other agricultural enterprises.

Community development

During the year, SCS participated in program and plan development for the Appalachian and Northern Great Lakes regions as well as for many smaller areas and communities. The Service provided information and assistance to conservation districts, planning boards, and other governmental units on problems of soil and water conservation and development, erosion and sediment reduction, flood prevention, outdoor recreation, and the limitations and suitabilities of soils for a wide variety of uses. SCS provided basic data for use in 355 comprehensive plans encompassing 3,367,607 acres. As a result, 749 properties totaling 23,377 acres were reported as properly treated.

Resource Conservation and Development Projects.—During the fiscal year, the sponsors of 10 pilot Resource Conservation and Development projects completed and submitted their project plans, and the Secretary of Agriculture authorized USDA assistance for operations. These projects include more than 17½ million acres in 34 counties in 11 States.

By June 30 about 300 separate "project measures," intended to provide new economic opportunities through accelerated conservation, development, and use of natural resources, had been completed or were underway.

Authorization has been requested for assisting 10 more project areas in planning and operations in fiscal 1966.

Appalachia.—The Soil Conservation Service began immediately to increase technical assistance for soil and water resource development in rural areas of Appalachia in response to the Appalachian Regional Development Act.

Summary of Progress, Fiscal Year 1965

Soil and Water Conservation in the United States

Progress items	Accomplished in fiscal year 1965— By use of funds under all SCS programs	By State employees & other agencies	Total reportable progress	Cumulative to June 30, 1965
Individual Conservation Plans and Related Services				
District cooperators .....No.	113,104	44	113,148	2,041,182
District cooperators .....acres	39,214,421	5,919	39,220,340	664,563,511
Cooperators canceled.....No.	65,705	10	65,715	—
Cooperators canceled .....acres	20,041,677	652	20,042,329	—
Landowners assisted.....No.	1,130,259	9,228	1,139,487	—
Services provided.....No.	3,297,559	26,028	3,323,587	—
Owners applying practices..No.	722,111	4,408	726,519	—
Basic plans prepared:				
Farm .....No.	96,292	—	96,292	1,489,322
Ranch .....No.	4,401	—	4,401	59,108
Other .....No.	4,317	—	4,317	22,392
(Total basic plans)	(105,010)	—	(105,010)	(1,570,822)
Farm .....acres	20,355,573	—	20,355,573	307,870,391
Ranch .....acres	15,094,462	—	15,094,462	185,662,938
Other .....acres	469,975	—	469,975	3,808,249
(Total basic plans, acres)..	(35,920,010)	—	(35,920,010)	(497,341,578)
Basic plans canceled:				
Farm .....No.	41,890	2	41,892	—
Ranch .....No.	1,571	—	1,571	—
Other .....No.	389	—	389	—
(Total plans canceled) ..	(43,850)	(2)	(43,852)	—
Farm .....acres	8,115,702	203	8,115,905	—
Ranch .....acres	5,182,850	—	5,182,850	—
Other .....acres	14,568	—	14,568	—
(Total plans canceled, acres)	(13,313,120)	(203)	(13,313,323)	—
Basic plans revised:				
Farm .....No.	36,626	2	36,628	—
Ranch .....No.	2,490	—	2,490	—
Other .....No.	200	—	200	—
(Total plans revised)	(39,316)	(2)	(39,318)	—
Farm .....acres	11,033,547	455	11,034,002	—
Ranch .....acres	10,515,936	—	10,515,936	—
Other .....acres	94,040	—	94,040	—
(Total plans revised, acres)	(21,643,523)	(455)	(21,643,978)	—
Consultive Services				
Services provided.....No.	93,725	297	94,022	—
Recipients .....No.	42,954	89	43,043	—
Basic data for use in comprehensive plans.....No.	355	—	355	—
Basic data for use in comprehensive plans.....acres	3,367,607	—	3,367,607	—
Properties adequately treated .....No.	749	—	749	—
Properties adequately treated .....acres	23,377	—	23,377	—
Operating Units				
Total operating units.....No.	4,968	—	4,968	4,737,908
Total operating units....acres	4,473,816	—	4,473,816	1,351,291,228
Other units.....No.	672	—	672	1,198,233
Group Conservation Plans and Services				
Group investigations.....No.	4,016	—	4,016	33,405
Group investigations.....acres	1,866,513	—	1,866,513	28,343,739
Group plans prepared.....No.	2,965	—	2,965	33,371
Group plans prepared....acres	1,403,000	—	1,403,000	24,559,408
Landowners or users in groups .....No.	16,309	—	16,309	236,900
Services provided on jobs..No.	48,203	192	48,395	—

Summary of Progress, Fiscal Year 1965—Continued

Progress items	Accomplished in fiscal year 1965— By use of funds under all SCS programs	By State employees & other agencies	Total reportable progress	Cumulative to June 30, 1965
Great Plains Conservation Program				
Applications received.....No.	3,925	—	3,925	24,268
Applications received.....acres	6,826,437	—	6,826,437	49,573,549
Contracts signed.....No.	3,739	—	3,739	19,956
Contracts signed.....acres	5,290,996	—	5,290,996	39,227,743
Contract modifications.....No.	14,603	—	14,603	65,487
Contracts terminated:				
By mutual consent.....No.	95	—	95	370
By mutual consent....acres	68,921	—	68,921	720,975
For cause.....No.	103	—	103	394
For cause.....acres	90,785	—	90,785	352,491
By expiration.....No.	1,309	—	1,309	4,060
By expiration.....acres	2,011,778	—	2,011,778	6,353,269
(Total terminations, No.)	(1,507)	—	(1,507)	(4,824)
(Total terminations, acres)	(2,171,484)	—	(2,171,484)	(7,426,735)
Cropland before GP contract, acres	1,017,393	—	1,017,393	5,880,234
Planned cropland conversion, acres	187,248	—	187,248	1,299,568
Agricultural Conservation Program				
Referrals received F.Y. 1965.No.	354,563	137	354,700	—
" " P.Y. 1964..No.	—	—	—	359,546
Referrals serviced F.Y. 1965.No.	334,893	142	335,035	—
" " P.Y. 1964..No.	—	—	—	349,019
Cropland Conversion Program				
CCP referrals received....No.	847	—	847	—
CCP referrals serviced.....No.	367	—	367	—
Soil Surveys				
Standard soil surveys:				
High intensity.....acres	2,604,720	152,060	2,756,780	26,405,906
Medium intensity.....acres	41,412,263	1,890,616	43,302,879	480,036,101
Low intensity.....acres	8,725,751	148,343	8,874,094	70,608,797
(Total)	(52,742,734)	(2,191,019)	(54,933,753)	(577,050,804)
Reconnaissance .....acres	976,935	—	976,935	7,821,410
Soil conservation surveys.acres	2,234,807	88,174	2,322,981	285,067,603
Soil conservation surveys canceled or converted..acres	14,668,686	65,104	14,733,790	—
Supplemental soil surveys.acres	1,391,316	28,405	1,419,721	—
Snow Surveys and Water Supply Forecasting				
Snow course measurements.No.	3,710	896	4,606	—
Aerial snow marker readings .....No.	555	146	701	—
Mountain precipitation gage readings .....No.	1,098	147	1,245	—
Soil moisture readings.....No.	1,173	252	1,425	—
River stations for which numerical forecasts issued.....No.	437	—	437	—
Numerical forecasts issued.No.	2,313	—	2,313	—
Income-Producing Recreation Enterprises				
Landowners with one or more income-producing recreation enterprises .....No.	5,034	1	5,035	31,521
Landowners with recreation enterprises as primary income source.....No.	610	—	610	2,743
Landowners with recreation enterprises as primary income source.....acres	140,476	—	140,476	631,742
Public Recreation Developments				
Recreation or fish and wildlife developments established as part of watershed projects .....No.	1	—	1	12

Twelve new watersheds were authorized for planning and 7 others approved for installation of land treatment and structural measures in the Appalachian region. There are now 38 projects in some stage of planning and 64 in operation. Total Federal cost of these 64 projects is estimated to be $69 million.

Eleven sponsoring local organizations signed their first project agreements in 1965, signaling the start of actual construction in their projects. About $5.9 million was obligated in small watershed projects in Appalachia during the year.

SCS also began arrangements to locate a new plant materials center to give special attention to revegetation problems in Appalachia. At the center and on nearby farms, SCS specialists will evaluate a wide variety of plants for use on the steep, shallow, acid soils of the region and to restore land left bare by mining operations to productive use for pasture, woodland, wildlife, or recreation.

Soil conservation districts

Since 1962 about two-thirds of the soil and water conservation districts have revised and updated their long-range programs to meet the expanding needs for resource conservation and development.

By the end of the fiscal year, 1,996 districts had signed new working agreements with the Department of Agriculture extending their goals to include conserving and improving not only soil and water but also "vegetative, wildlife, and related resources, and reducing damage by floods and sedimentation."

Thirty-six new conservation districts including 21,931,801 acres were organized by local people during the year. Consolidations and other changes eliminated 18 districts, resulting in a net increase of 18 districts and 14,073,002 acres over figures of a year ago. At the end of the year, SCS was assisting 2,989 districts totaling 1,753,281,-

000 acres. The districts contain 98 percent of the farms and ranches and 95 percent of the land in farms in the United States, Puerto Rico, and the Virgin Islands.

Conservation planning.—Soil conservation districts added 113,148 new cooperators operating 39,220,340 acres during fiscal 1965, bringing the total number of cooperators to 2,041,182, equivalent to about 55 percent of all the farms in districts. The cooperative agreements cover 664,563,511 acres, or 38 percent of the area in districts.

SCS helped cooperators prepare 105,010 basic conservation plans for 35,920,010 acres. A total of 497,341,578 acres, or 75 percent of the land under agreement, is covered by basic plans.

Land treatment.—For the first time this year, onsite information was collected on the acreage of land "adequately treated;" i.e., to which all items of the needed *combinations* of practices had been applied according to the standards and specifications of local technical guides.

The planned treatment was completed on 22,692,192 acres during the year, equivalent to 63 percent of the acreage for which basic plans were prepared.

A total of 209,309,189 acres was reported as adequately treated as of June 30, about 42 percent of the total acreage covered by basic conservation plans.

The table contains data on the amounts of each of 128 separate practices applied during fiscal year 1965 and "on the land" at the end of the year.

Watershed protection

To reduce costs and increase efficiency, the Soil Conservation Service combined its watershed planning and river basin planning functions under the leadership of an assistant deputy administrator and placed watershed operations under another assistant deputy administrator.

During the past year the SCS

Summary of Progress, Fiscal Year 1965—Continued

Practices	Accomplished in fiscal year 1965— By use of funds under all SCS programs	By State employees & other agencies	Total reportable progress	On the land June 30, 1965
Conservation Practices Applied				
Bedding ....acres	20,871	639	21,510	398,969
Brush and weed control..acres	5,856,194	15,185	5,871,379	32,742,596
Irrigation canal or lateral ....miles	347	—	347	37,179
Cattle walkway....miles	6	—	6	253
Chiseling and subsoiling..acres	563,086	537	563,623	3,356,848
Clearing and snagging...miles	210	—	210	1,863
Conservation cropping system ....acres	21,803,147	41,430	21,844,577	147,504,415
Contour farming....acres	4,510,397	14,933	4,525,330	41,717,487
Contour furrowing....acres	68,772	—	68,772	662,704
Contouring orchard, etc...acres	8,666	70	8,736	184,290
Controlled burning....acres	382,550	—	382,550	2,888,064
Cover and green manure crop ....acres	3,892,773	13,555	3,906,328	25,436,975
Critical area planting....acres	90,465	15,869	106,334	1,302,236
Crop residue use....acres	16,475,141	40,373	16,515,514	106,550,740
Cutback border....feet	699,897	800	700,697	7,127,654
Dam, diversion....No.	986	—	986	18,646
Dam, multiple-purpose....No.	258	1	259	3,891
Debris basin....No.	2,934	7	2,941	79,959
Range deferred grazing ..acres	14,908,410	810	14,909,220	48,185,135
Desilting area....acres	1,434	—	1,434	2,640
Dikes and levees....miles	245	—	245	8,220
Irrigation ditch and canal lining ....miles	1,552	—	1,552	18,736
Ditchbank seeding....miles	1,596	29	1,625	17,130
Diversions ....miles	2,909	19	2,928	88,361
Dune stabilization....acres	6,108	—	6,108	81,090
Emergency tillage....acres	483,472	—	483,472	4,355,948
Farm pond....No.	55,907	197	56,104	1,420,733
Farmstead and feedlot windbreak ....acres	42,205	263	42,468	637,243
Field border planting....miles	1,274	5	1,279	38,309
Irrigation field ditch....miles	3,257	2	3,259	116,581
Field windbreak....miles	4,049	68	4,117	75,839
Firebreak ....miles	11,131	9	11,140	128,093
Fish and crop rotation...acres	5,205	—	5,205	19,009
Fishpond stocking....No.	43,263	109	43,372	723,608
Fishpond management....No.	20,217	51	20,268	113,513
Floodwater diversion....feet	16,664	—	16,664	1,046,154
Floodwater-retarding structure ....No.	661	—	661	7,423
Floodway ....miles	28	—	28	296
Grade stabilization structure ....No.	7,231	61	7,292	136,852
Grasses and legumes in rotation ....acres	1,563,862	4,604	1,568,466	17,821,663
Grassed waterway or outlet ....acres	77,049	420	77,469	1,706,889
Hedgerow planting....miles	359	11	370	30,525
Hillside ditch....miles	362	117	479	7,586
Irrigation pipeline....miles	4,101	1	4,102	42,607
Irrigation storage reservoir ....No.	1,502	10	1,512	36,115
Irrigation system, sprinkler ....No.	4,109	1	4,110	86,206
Irrigation system, surface and subsurface ....No.	5,123	1	5,124	96,585
Irrigation system, tailwater recovery ....No.	484	—	484	6,340
Irrigation water management ....acres	2,656,552	2,685	2,659,237	10,900,269
Land clearing....acres	705,313	1,234	706,547	10,707,083
Drainage land grading..acres	28,581	735	29,316	163,154
Irrigation land leveling..acres	457,316	602	457,918	8,154,537
Land smoothing....acres	367,710	851	368,561	4,458,609
Livestock exclusion....acres	885,110	1,721	886,831	17,633,030
Minimum tillage....acres	1,074,137	217	1,074,354	6,619,449
Drainage main or lateral..miles	8,164	163	8,327	279,256

Summary of Progress, Fiscal Year 1965—Continued

Practices	Accomplished in fiscal year 1965— By use of funds under all SCS programs	By State employees & other agencies	Total reportable progress	On the land June 30, 1965
Conservation Practices Applied—Continued				
Mole drain.....miles	14,350	—	14,350	16,162
Mulching.....acres	32,478	—	32,478	362,534
Mulch planting.....acres	41,602	1	41,603	167,203
Woodland natural seeding.acres	62,606	384	62,990	2,700,793
Obstruction removal.....acres	35,988	110	36,098	623,737
Pasture and hayland renovation.....acres	1,574,953	7,439	1,582,392	17,399,592
Pasture and hayland planting.....acres	2,299,339	8,180	2,307,519	44,382,787
Pipeline for livestock water.....miles	1,643	9	1,652	14,190
Pitting.....acres	17,702	—	17,702	152,895
Plow planting.....acres	112,543	149	112,692	1,421,950
Pond sealing or lining....No.	607	—	607	7,927
Pasture proper use.....acres	7,690,290	35,812	7,726,102	27,545,044
Range proper use.....acres	64,635,143	8,644	64,643,787	179,723,521
Woodland proper gazing.acres	1,419,444	—	1,419,444	8,873,124
Pumped well drain.....No.	4	—	4	112
Pumping plant for water control.....No.	2,250	—	2,250	40,233
Range renovation.....acres	9,604	—	9,604	1,528,413
Range seeding on converted land.....acres	145,701	1,087	146,788	4,321,364
Range seeding.....acres	365,146	268	365,414	7,536,474
(Total range seeding acres)	(510,847)	(1,355)	(512,202)	(11,857,838)
Irrigation pit or regulating reservoir.....No.	2,546	3	2,549	38,860
Regulating water in drainage systems.....acres	76,910	—	76,910	953,485
Rock barrier.....miles	3	—	3	51
Range rotation—deferred grazing.....acres	2,434,035	284	2,434,319	9,120,387
Row arrangement.....acres	406,778	52	406,830	2,017,480
Rotation grazing.....acres	3,601,922	32,297	3,634,219	12,284,407
Recreation access road...miles	461	3	464	3,459
Recreation area stabilization.....acres	1,969	—	1,969	16,548
Recreation area planting..acres	10,546	8	10,554	68,783
Recreation area pruning and thinning.....acres	3,591	69	3,660	27,900
Recreation land grading and shaping.....acres	5,473	—	5,473	63,072
Recreation trail and walkway.....miles	202	—	202	1,264
Spoilbank spreading.....miles	6,255	34	6,289	116,862
Spring development.....No.	4,827	14	4,841	82,009
Stock trail.....miles	183	—	183	3,296
Streambank protection....miles	326	1	327	4,380
Stream channel improvement.....miles	1,158	—	1,158	9,156
Stream channel stabilization.....feet	56,685	—	56,685	2,570,970
Stripcropping contour....acres	206,462	4,336	210,798	5,270,989
Stripcropping, field.....acres	68,097	79	68,176	2,005,285
Stripcropping, wind.....acres	432,997	—	432,997	12,804,524
(Total stripcropping, acres)	(707,556)	(4,415)	(711,971)	(20,080,798)
Structure for water control.No.	89,298	110	89,408	1,395,451
Stubble mulching.....acres	3,396,194	—	3,396,194	17,976,013
Drainage field ditch.....miles	6,210	57	6,267	150,348
Terrace, basin.....miles	110	1	111	2,306
Terrace, gradient.....miles	16,331	134	16,465	836,329
Terrace, level.....miles	12,395	17	12,412	352,250
Terrace, parallel.....miles	4,918	16	4,934	34,673
(Total terraces, miles)....	(33,754)	(168)	(33,922)	(1,225,558)
Tile drain.....miles	22,150	327	22,477	621,639
Tile system structure.....No.	9,202	76	9,278	146,287
Toxic salt reduction.....acres	69,267	3	69,270	1,054,886
Tree planting.....acres	295,650	14,667	310,317	11,837,976
Trough or tank.....No.	12,271	111	12,382	288,129
Vegetative barrier.....miles	301	231	532	6,000

provided additional Departmental leadership in several interagency assignments including (1) the Potomac River Basin Study Group, (2) the North Atlantic Regional Drought Study, and (3) the Water Resources Council.

Planning.—Applications for Soil Conservation Service assistance in watershed planning under Public Law 566 were received for 180 watersheds in fiscal 1965, bringing the total to 2,317 requests from 49 States and Puerto Rico.

New authorizations for planning of 109 watersheds brought the total to 1,111, or 48 percent of the applications received to date. Although States and local authorities contributed more than $3 million to accelerate planning work, the backlog of unserviced applications increased by 71 during the year.

A record number of 96 plans were completed during fiscal 1965, and 66 were approved for operations. Major changes were approved in the plans for 32 projects.

Operations.—At the close of the year Federal assistance was being provided to 635 approved projects to plan and install land treatment measures and make the engineering surveys and designs required in advance of construction.

Initial agreements for construction were signed in 59 projects located in 31 States, bringing the total to 455 projects that have entered the construction stage. Of this number, 424 or 93 percent have signed contracts for the installation of structural measures.

All land treatment and structural measures have been completed in 78 projects located in 30 States. A total of 41 States now have 1 or more projects with all structural measures installed.

Multipurpose projects.—More than 47 percent of small watershed projects approved for operations now have multiple-purpose objectives. Sixty-five percent of those approved in 1965 are multipurpose projects and 19 previously approved plans were amended to

make them multipurpose. Principal additions were recreation and municipal water supply.

Plans for 19 recreation developments were approved for operations in fiscal 1965, an increase of 53 percent over the previous year. There also were 46 new preliminary approvals for recreation projects. Other purposes in addition to flood prevention increased as follows: Municipal water supply, 20 percent; water management, 19 percent; and fish and wildlife, 8 percent.

Other projects.—Work plans were prepared for 10 subwatersheds covering about 489,000 acres in the 11 major river watersheds authorized for flood prevention work. To date, 244 plans have been prepared for 19,454,000 acres, or about 63 percent of the total authorized area.

By June 30, 1965, all works of improvement had been installed on 50 of the pilot projects authorized in 1953. Four more are scheduled for completion in 1966.

River basin surveys

The Soil Conservation Service participated in 31 interagency river basin surveys during fiscal 1965 under the provisions of Public Law 566.

The Service has developed proposals for participation of the Department of Agriculture in the Water Resource Survey to be carried out under the provisions of the Appalachian Regional Development Act.

With assistance from other concerned agencies, SCS prepared comments under procedures of the Interagency Committee on Water Resources on 37 proposed projects of the Corps of Engineers, 10 proposed reports of the Bureau of Reclamation, and 3 other proposed reports.

Great Plains conservation

Interest of landowners in the Great Plains Conservation Program continued high in fiscal 1965. New contracts covering conservation and land use adjustment plans on 5,290,996 acres were signed by 3,739 cooperators. A backlog of 4,312 unserviced applications was carried over awaiting new funds for the 1966 fiscal year.

By the end of the year, 19,956 cooperators with 39,227,743 acres had participated in the program in 395 designated counties.

New contracts in 1965 included plans to convert 187,248 acres of cropland to grass, one of the major objectives of the program. Planned conversions now total 1,299,568 acres, or 22 percent of the cropland on the farms and ranches before planning.

Establishment of permanent vegetative cover continued to be the leading practice established under cost-sharing arrangements. Participants in 1965 established or reestablished vegetation on 172,627 acres. Other practices in order of the amount of cost-shares paid were terrace construction, 5,673 miles; controlling competitive shrubs, 347,810 acres; dams, pits, or ponds, 2,123; wells for livestock water, 1,648; and reseeding rangeland, 99,127 acres.

Cropland conversion

Land use adjustments in accordance with conservation plans in soil conservation districts and watershed projects continued to move large acreages out of cultivation during 1965.

An estimated 2 million acres of cropland was converted to other uses, including 1,887,901 acres to grassland, 123,640 acres to woodland, 71,143 acres to wildlife and recreation, and 90,870 acres to

Summary of Progress, Fiscal Year 1965—Continued

Practices	Accomplished in fiscal year 1965— By use of funds under all SCS programs	By State employees & other agencies	Total reportable progress	On the land June 30, 1965
Conservation Practices Applied—Continued				
Vertical drain.....No.	65	1	66	1,524
Waterspreading .....acres	34,387	4,850	39,237	853,583
Well .....No.	7,954	4	7,958	324,835
Wildlife habitat preservation .....acres	1,328,556	765	1,329,321	7,881,907
Wildlife wetland development .....acres	69,255	70	69,325	730,146
Wildlife habitat development .....acres	237,900	248	238,148	2,794,598
Wildlife wetland preservation .....acres	183,433	20	183,453	1,537,469
Wildlife watering facility..No.	310	—	310	5,249
Woodland direct seeding..acres	16,902	20	16,922	369,280
Woodland harvest cutting.acres	828,810	2,765	831,675	13,539,227
Woodland intermediate cutting .....acres	856,853	375	857,228	13,108,662
Woodland interplanting...acres	28,123	948	29,071	765,129
Woodland pruning.....acres	12,900	2,326	15,226	332,423
Woodland thinning.....acres	51,894	2,287	54,181	1,555,091
Woodland underplanting..acres	28,533	3,163	31,696	709,594
Woodland weeding.....acres	402,441	6,488	408,929	8,615,269
Land Treated				
Land adequately treated..acres	22,683,035	9,157	22,692,192	209,309,189
Land Use Conversions [1]				
Cropland to grassland....acres	1,885,896	2,005	1,887,901	10,108,893
Cropland to woodland....acres	123,321	319	123,640	1,169,392
Cropland to wildlife-recreation .....acres	71,138	5	71,143	507,708
Cropland to "other"....acres	90,858	12	90,870	2,037,673
All other uses to cropland.acres	386,668	36	386,704	2,741,894
All other uses (except cropland) to wildlife-recreation...acres	213,035	24	213,059	1,633,207

[1] Conversions on the land June 30, 1965, are estimates of conversions since July 1, 1962.

"other" uses. A small part of this was offset by conversion by farm operators of about ⅓ million acres from other uses to cropland, resulting in a net reduction in cropland of 1⅔ million acres.

A review of land use changes in small watershed projects showed that the net effect of land treatment is a reduction in cropland and increase in grassland.

In the first 540 watershed work plans approved, cropland was reduced 168,800 acres while pasture and range increased 753,300 acres.

An analysis of 10 years' land use adjustment in the Six Mile Creek Watershed Project in Arkansas showed that cropland was reduced from 30,061 acres before the project to 5,970 acres in 1963 —an 80 percent reduction.

In eight representative projects in Texas covering 1.75 million acres, total cropland has been reduced from 556,000 to 480,000 acres, or 14 percent. Acreage in cotton was reduced 55 percent and in corn 75 percent.

Soil surveys

With a large backlog of field work completed, SCS in fiscal 1965 stepped up the preparation of soil surveys for publication. Thirty-nine surveys were published and 49 were in press at the end of the year, compared to 34 published in 1964.

New mapping during the year totaled 57,256,734 acres, bringing the total area covered by surveys suitable for use in farm and ranch planning to 862,118,407 acres. This amounts to about 38 percent of the total land area scheduled to be surveyed.

On January 1, 1965, the Soil Conservation Service began using a new system of soil classification that had been in the process of development for several years. New soil survey manuscripts identify the series by the new classification.

Soil investigations designed to answer specific questions in soil surveys and interpretation continued. During the year, characterization analyses were completed on 1,996 samples from 304 profiles in 27 States.

New methods were adopted for determining calcium, magnesium, aluminum, and carbonates; for extracting and determining free iron; and for preparing saturation extracts.

A program was developed for the automated processing of calculations of bulk density and moisture relations.

The cartographic plants produced 497,183 prints of 159,735 plain maps and 378,146 prints of 134,775 soil and capability maps for farm planning.

Conservation Needs Inventory

In March 1965, eight USDA agencies were directed to update the National Inventory of Soil and Water Conservation Needs. This inventory will provide data on physical conditions, present land use, conservation problems, and treatment needs of non-Federal rural land. Completion date is December 31, 1967. Procedures for updating the watershed projects inventory were issued in August 1964, calling for completion by December 31, 1967.

The cost of conservation

An analysis of costs and sources of funds for conservation treatments applied on private land (exclusive of watershed programs, resource developments, and land adjustment programs) in fiscal 1965 showed that landowners and local districts carried more than half the burden.

Of an estimated total of $923.3 million, landowners and districts provided $535.3 million or 58 percent, States and local agencies and organizations $50.1 million or 5 percent, and Federal appropriations $337.9 or 37 percent. Soil conservation operations (SCS) funds amounted to $103.2 million or 11 percent of the total, and ACP cost-shares an estimated $220 million or 24 percent.

For every dollar of Federal funds provided for the design, layout, and installation of planned practices in 1965, about $12 of conservation treatments were applied by cooperating landowners, of which about one-third was financed by cost-share programs.

Advances in technology

Plant sciences.—Use of the universal soil loss equation, first developed in the Corn Belt, has been extended to other regions as the major technical basis for developing specifications for conservation cropping systems. Continuing research is needed to provide basic data for the several factors in the equation in different parts of the country.

During the year the Soil Conservation Service gave increased technical range planning assistance to the Farmers Home Administration and grazing associations in the West. The Service issued national standards for range conservation practices and for range proper use.

A system for classifying soils for woodland use on a nationwide basis has been developed. It will be subjected to field test in the next year. There is increasing interest in windbreak activities throughout the Great Plains and in several Western States.

SCS biologists responded to an increased number of requests for technical information on wildlife in connection with income-producing recreation enterprises. The preparation of information on the economic costs and returns of recreation is being encouraged.

Installations in California watershed projects to provide for passage of steelhead trout and salmon to their spawning grounds successfully passed the test of the 1964-65 winter spawning runs.

The Service's plant materials centers continue to develop and introduce new conservation plants. Seed increase on district cooperators' farms in the South is gain-

ing impetus with stocks originating at the Americus and Coffeeville centers.

Substantial improvements were made in facilities, equipment, and appearance at a number of centers. Two additional centers were authorized during the year, bringing the total to 20. One is being located in New Jersey to serve the Atlantic Coastal Plain and the other in the Appalachian region.

Engineering.—Considerable progress was made in the refinement of engineering design policy and the development of design procedures. Standard construction drawings for covered risers for drop inlet spillways were completed under a contract for engineering services.

The snow survey and water supply forecasting activity entered new phases of work in a continuing effort to provide better forecast information to the public. Agreements were signed for the development of electronic telemetry systems in two States and for installation of fully automatic data collection systems in three others.

The Service is cooperating with the Bureau of Reclamation in the Atmospheric Water Resources Program in Colorado and is expanding its snow survey network in Alaska in cooperation with the Corps of Engineers.

The volume of hydrologic work increased in river basin surveys, assistance in foreign aid programs, and the electronic processing of hydrologoic problems of watersheds and river basins.

During the year, the Soil Mechanics Laboratory processed 8,629 samples from 872 sites.

Good progress was made in the development of systematic methods of planning parallel terrace systems compatible with the use of large farm equipment.

There has been a noticeable increase in cooperation and exchange of ideas and data with engineers and geologists from other Federal and State agencies in completing geologic investigations for construction. Cooperative studies, with the U. S. Geological Survey, Agricultural Research Service, and others, concerning reservoir trap efficiency, sediment yield, gully erosion, and control measures are continuing.

A work project was set up to undertake the classification of earth dams commonly encountered in watershed and other SCS activities. The purpose of a classification system is to group dams into categories for which appropriate design and construction criteria may be assigned. This is aimed at reducing time spent by design engineers, providing a more uniform approach to design and construction problems, and general improvement in the quality of completed construction work.

Personnel

During the year the Service relocated technical personnel in the field giving support to State offices from 15 different headquarter locations to 4 Regional Technical Service Centers at Upper Darby, Pa.; Fort Worth, Tex.; Lincoln, Nebr.; and Portland, Oreg. These moves, involving 254 employees, resulted in savings in personnel, office space, travel, and other costs, and made possible better coordination of services from different subject matter specialists. Also, 7 area offices were discontinued.

In accordance with the Civil Rights Act of 1964, SCS has taken positive steps to assure that nondiscrimination is practiced in providing services to land owners and operators and in hiring, training, and promoting SCS personnel. All SCS offices were desegregated before the end of the fiscal year. While total SCS employment increased 2.3 percent during fiscal 1965, employment of Negroes increased 152 percent.

SCS has found a scarcity of qualified Negro graduates available for recruitment in fields involved in soil and water conservation. The Service has made tangible progress in assisting colleges and universities, including Negro institutions, in upgrading their agricultural and engineering curricula and standards.

Economic Opportunity Act

The Soil Conservation Service provided technical direction to Neighborhood Youth Corps projects in 23 States and work-study programs for students in 6 States under the Economic Opportunity Act.

The projects were planned, sponsored, and operated by State soil and water conservation commissions and local conservation districts. They gave more than 1,200 young people summer income and on-the-job training in conservation work in field and office. In all, more than 400 districts participated in the program.

Conservation in foreign lands

The Soil Conservation Service continued to operate conservation projects in Algeria and Tunisia under contracts with the Agency for International Development (AID). In 1965, SCS also provided two soil scientists as members of a team for the Frontier Development Program in Brazil, four specialists as trainers in soil and water conservation programs in Nigeria, and an agronomist as a trainer in Nicaragua.

In addition several technicians were on detail to Costa Rica, El Salvador, Morrocco, and Thailand to assist and advise on special projects. The Administrator consulted with and advised the governments of Costa Rica and El Salvador on special erosion problems.

During 1965 SCS provided training to 151 individuals and 22 groups of foreign nationals from 53 countries. This training was provided from the Washington office, 12 units of the Regional Technical Service Centers, and in field locations in 35 States. ♦

From the Administrator:

Conserving Grazing Land— A Landmark Passed

GRAZING LANDS today are important in every State. No longer is the conservation of grassland a concern primarily of rangemen and ranchers of the West.

The extension into all parts of the country of livestock production based on growing and using grass is just one of the fundamental changes in American agriculture brought about by changing technology.

The Soil Conservation Service has had a major part in developing the grassland technology and encouraging the land use shifts that have made this result possible.

The Service is constantly adjusting its staffing to provide the technical guidance needed with the new land use patterns. We want to be prepared to aid land owners and users with the conservation and management of the several types of grazing land in each section of the country.

Livestock operators—whether they produce beef, wool, lamb, milk, mohair, riding horses, or outdoor recreation opportunities—depend on one or more kinds of grazing land. Stable and efficient livestock enterprises contribute to the well being of communities and of the Nation. Conservationists who assist livestock operators and other users of grazing land must have the most modern and best technical information available.

Proper grazing is important not only to soil and water conservation as a part of individual livestock enterprises; it is essential to effective watershed protection, to wildlife habitat improvement, and to recreation resource development. Many of our valuable grazing plants are also finding wide use in stabilizing critical erosion areas, in highway plantings, and for improving the natural beauty of the countryside.

Rangemen, agronomists, plant materials specialists, and soil scientists, working together as a team, furnish the needed technical information and support to the conservationists who directly assist land owners and users. Each of these technical disciplines is involved in sound grazing land conservation.

It is important, therefore, that conservationists in every work area be familiar with the principles of grazing land conservation and management and know how to apply them to the types of grazing land found locally.

THE NATIONAL program of soil and water conservation on private land passed a significant landmark in 1965 when the number of district cooperators for the first time exceeded 2 million.

The annual summary of accomplishments shows that more than half—a majority—of the 3.7 million farms and ranches in districts (which include 98 percent of all those in the United States) now have orderly plans for using land within its capability and conserving basic soil and water resources. Nearly 1.5 million or three-fouths of them have plans sufficiently complete to be counted as "basic" conservation plans.

While the steady decline in number of farms and ranches has helped to close the gap between number of district cooperators and total operators, the shift to nonfarm uses has created a new clientele for conservation services.

An increasing number of rural property owners are using their land for recreational or esthetic purposes rather than for the production of crops, livestock, or other commodities. This requires a different kind of evaluation of land and water resources and different ways of manipulating them to get the desired benefits without permitting deterioration of their essential values.

More and more land on the edges of cities and in rural areas is being devoted to industrial and residential sites. These uses of land sometimes are more demanding on technical knowledge of soils and hydrology and the principles and techniques of safe land use than are the usual agricultural endeavors. They present a pyramiding need for perceptive conservation planning and sound technical advice in these areas.

The 1965 report reflects our increasing activity in these new aspects of technical assistance on land and water problems. For example, the Soil Conservation Service last year provided more than 94,000 consultive services on such matters to private individuals, organizations, business concerns, and public agencies.

SCS fieldmen also helped many rural landowners establish outdoor recreation enterprises. They provided more and more assistance to official local planning bodies for communitywide resource development and land use planning.

Much of this kind of effort does not lend itself to numerical recording and does not show in statistical reports of progress. But SCS fieldmen throughout the country and the people they work with are aware of our increasing attention to an ever broadening range of conservation problems.

Although we may have passed the half-way mark in enlisting farmers and ranchers in the conservation effort, a still greater challenge lies ahead in the necessary job of providing adequate guidance in soil and water conservation to all land users.

D. A. WILLIAMS

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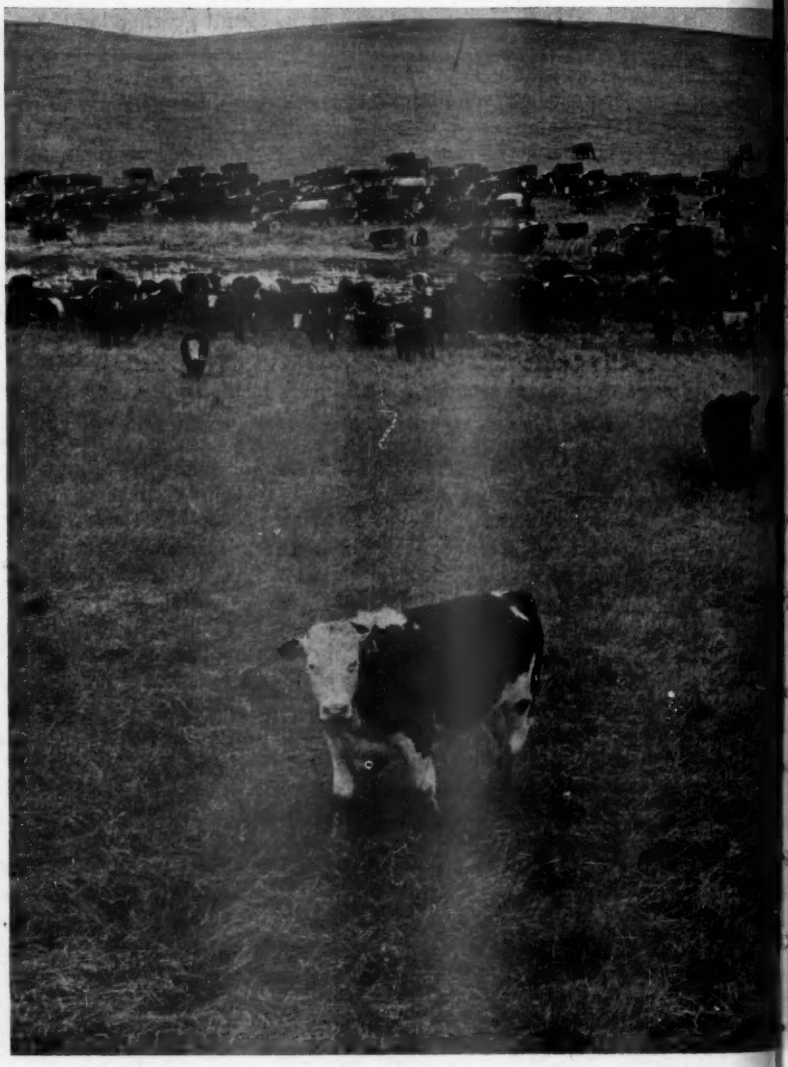
Steer Ranching And Deferment Improve Range

BY STICKING to steers and leaving more grass than they take, a South Dakota rancher has transformed low-producing, weed-infested rangeland into a showplace of native grass.

Tom Boylan of Leola became a cooperator of the McPherson County Soil and Water Conservation District in 1959. His conservation ranch plan called for proper range use, deferred grazing, water developments, and cross fencing.

Principal grasses on the Boylan ranch are big and little bluestem, green needlegrass, and western wheatgrass. Some pastures were rested from grazing for 2 years to permit better grasses to get ahead of the weeds. Now, between 500 and 700 acres of rangeland gets a complete deferment every year. Deferments are rotated so that all rangeland is rested once every 5 years.

Boylan runs between 1,000 and 1,400 yearling steers on his 6,400 acres. He likes steers because they provide more flexibility in numbers. His gains on steers, from grass alone, have averaged slightly over 2 pounds per head per day from April to October.—THOMAS H. POZARNSKY, *Range Conservationist, SCS, Mobridge, S. Dak.* ♦



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